

issued to Barbetta discloses one representative system for measuring the voltage of fuel cells in a fuel cell stack.

Applicant stated in paragraph 8 of the background discussion that the giant magnetoresistive phenomenon that uses a magnetoresistor whose resistance changes in response to a magnetic field is also known in the art. U.S. Patent No. 4,937,521 issued to Yoshino et al. discloses a representative example of a current detecting device based on this phenomenon.

What Applicant is suggesting is not taught or suggested in the prior art is employing the giant magnetoresistive phenomenon in a fuel cell voltage monitoring device for a fuel cell system as claimed by Applicant.

The Examiner is respectfully reminded of the requirements of a *prima facie* case of obviousness. MPEP 2143 states that in order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference(s) must teach or suggest all of the claim limitations. Applicant submits that the Examiner has not established a *prima facie* case of obviousness because there is no suggestion or motivation in either Barbetta or Yoshino et al., or in the knowledge generally available to one of ordinary skill in the art, to use a magnetoresistive resistor in a Wheatstone bridge for a fuel cell voltage monitoring device.

MPEP 2143.01 I addresses the requirements for the first criteria of the suggestion or motivation to modify references. Particularly, that section of the MPEP states that there are three (3) possible sources for a motivation to combine references,

namely, the nature of the problem to be solved, the teachings of the prior art and the knowledge of persons of ordinary skill in the art, citing In Re Rouffet, 149 F.3d, 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998). The In Re Rouffet Court stated that the combination of the references taught every element of the claimed invention, however, without a motivation to combine, a rejection based on a *prima facie* case of obviousness is improper. Further, MPEP 2143.01 states that the Court in Al-Site Corp. v. VSI Int'l Inc., 174 F.3d 1308, 50 USPQ 2nd 1161 (Fed. Cir. 1999) stated that the level of skill in the art cannot be relied upon to provide the suggestion to combine references.

MPEP 2143.01 I also states that “[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so, either explicitly or implicitly in the reference themselves, or in the knowledge generally available to one of ordinary skill in the art.” “The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole, would have suggested to those of ordinary skill in the art.” In Re Kotzab, 217 F.3d 1365, 1370, 55 USPQ 2d 1313, 1317 (Fed. Cir. 2000).

The nature of the problem addressed by Applicant's invention is to provide a reliable and inexpensive technique to monitor the voltages of the fuel cells in a fuel cell stack. However, nothing in Barbetta or Yoshino et al. would suggest to a person of ordinary skill in the art that using a current sensing device employing a giant magnetoresistive resistor to measure current flow through a conductor can be used for monitoring the voltage of the fuel cells in a fuel cell stack.

MPEP 2143.01 III states that the mere fact that references can be combined or modified does not render the combination obvious unless the prior art also

suggests the desirability of the combination. Therefore, the fact that the current detecting device taught by Yoshino et al. could be combined in the Barbetta fuel cell voltage monitoring device is not relevant because Yoshino et al. does not teach or suggest that its current detecting device can be used in such a manner.

MPEP 2143.01 IV states that statements that the modification of the prior art based on the references would have been well within the ordinary skill of the art at the time the invention was made because the references relied upon teaches that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. MPEP 2143.01 cites In Re Kotzab, 217 F3d 1365, 1371, 55 USPQ 2d, 1313, 1318 (Fed. Cir. 2000) to support this position, where the Court held that *prima facie* obviousness was not established because there was no finding as to the principle or specific understanding within the knowledge of a skilled artisan that would have motivated the skilled artisan to make the claimed invention.

In Re Conn, 78 USPQ2d 1329 (CAFC 2006) addresses the motivation/suggestion/teaching element of establishing a *prima face* case of obviousness. The Court in In Re Conn at 1335 stated that the PTO is required to explain the motivation, suggestion or teaching that would have led the skilled artisan at the time of the invention to claim the combination as a whole, otherwise the PTO has used hindsight to conclude that the invention was obvious. The Examiner states on page 3 of the Office Action “[t]hat Barbetta and Yoshino et al. are analogous current measuring devices, and at the time of the invention it would have been obvious to add a Wheatstone bridge with GMR type resistors to Barbetta for the benefit of accurately reading current/voltage of each cell while ensuring isolation existed between the cells

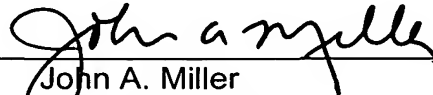
high voltage and the measurement electronics . . . ”. However, what Applicant submits that the Examiner has failed to do is explain why one of ordinary skill in the art would combine the current detecting device of Yoshino et al. into the fuel cell voltage detecting device of Barbetta, and therefore has used improper hindsight.

Dependent claims 5, 11 and 18 include a polarity reverser that reverses the polarity of the current from the fuel cells before the current is applied to the conductor so that the current through the conductor is always propagating in the same direction. Applicant submits that Barbetta does not teach a polarity reverser in its fuel cell voltage monitoring device because it is not using the propagation of current through a conductor, that generates the magnetic field that is detected by the magnetoresistive resistor, as part of its device. Further, the current detecting device in Yoshino et al. would not need a polarity reverser because there is no indication in Yoshino et al. that the current detected by the conductor in the device would be propagating in opposite directions. Therefore, Applicant submits that the combination of Barbetta and Yoshino et al. does not teach this feature of Applicant's claimed invention.

In view of the preceding discussion, it is respectfully that the §103(a) rejection be withdrawn.

It is now believed that this application is in condition for allowance. If the Examiner believes that personal contact with Applicant's representative would expedite prosecution of this application, he is invited to call the undersigned at his convenience.

Respectfully submitted,

By: 
John A. Miller
Reg. No. 34985
Phone: (248) 364-4300

General Motors Corporation
300 Renaissance Center
P.O. Box 300
Detroit, MI 48265-3000
(313) 665-4708

Dated: 8/15/06